



# Water Safety Considerations for Recommissioning and Reoccupation



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# Overview

This guidance document is intended to offer some insight into the considerations for water safety during planning for reoccupation of workplaces. This guidance is specific to the commercial/education/public sectors and does not include guidance on healthcare/industrial premises.

Due to the COVID-19 pandemic and government action to reduce the transmission, large parts of the above sectors have had hugely reduced occupancy; as such, water systems may have seen increased potential for stagnation.

This is a big problem for water safety as stagnation is one of the key factors requiring reduction, as far as reasonably practicable, to manage risk. As facilities management teams begin to plan for reoccupation, this document should prove useful with its considerations for opening up in a safe way.

# Understanding the Situation

First of all, it is imperative that the individual situation for your estate be understood; the types of systems that are installed and their risk profiles need to be taken into account, along with the understanding of whether or not mitigating action was put into place to reduce the potential for stagnation.

Consider the following:

- Was the building closure managed by following an agreed process such as a 'mothballing plan' (if not, there may be heightened risk)?
- During lockdown, were there mitigation measures put in place to combat the potential stagnation issue such as enhanced flushing regimes?
- Do you have any specialist or high risk systems that will need special attention such as humidifiers, biocide dosing units, cooling towers or adiabatic chillers etc.
- Was the system in good health before lockdown or were there some areas for concern (any areas of concern would likely be exacerbated by the effects of lockdown)?

# Hot and Cold Water Systems

For the purposes of this guidance document, the 'hot and cold water system' is a system that feeds hot or cold water intended either for human consumption or sanitation purposes up to the point of use from an outlet or up to the point of connection to an item of water-using equipment such as a humidifier etc.



# Recommissioning and Validation

Recommissioning is a process that is rarely undertaken on this scale and, when it is undertaken, is often fraught with issues and needs careful planning to ensure it goes smoothly.

## The Plan

Before the recommissioning can start, it is good practice to collate together a plan for your estate, with each building considered as a separate entity and any specialist systems managed according to their application and manufacturer's guidance. The plan should cover:

- Operational considerations such as timeframes for reoccupation, criticality of infrastructure and the availability of labour.
- Reoccupation from both the perspective of the physical tasks to be undertaken such as system disinfection and its management, providing assurance at each stage of the safety of those returning to work.
- Initial works all the way through to validation sampling including any resultant escalation action to be taken if the system is deemed unsuitable for reoccupation following the recommissioning process.

## System Disinfection

Each building that has not been in constant use during the lockdown period will most likely require a full system drain down (flushed of the stagnant water), refilling and subsequent disinfection as a basic start for recommissioning.

The disinfection should be completed by competent persons following an approved method, the most common being detailed in the British Standard addendum, PD 855468:2015, *Guide to the flushing and disinfection of services supplying water for domestic use within buildings and their curtilages*).

Most system chemical disinfections will be based on a Chlorine-based product or a hydrogen peroxide-based product. Where the system has been left stagnant without flushing for a prolonged period, it is advisable to opt for a chemical-based process rather than a thermal disinfection. Either of the two above-mentioned chemicals can be used but advice on the effectiveness of each should be sought from a Competent Person as they have different properties and the specifics of the system should be considered.

It is important to note for drinking water systems that hydrogen peroxide is not suitable for being left in the system as it is not an approved disinfectant for human consumption and, if used, must be flushed out and proven to be cleared.

The system disinfection should cover all systems, both hot and cold, and every outlet should be independently tested to ensure all internal surfaces have come into contact with the disinfectant.

## Risk Assessment

The risk assessment, as the first and most important document in water management, must be formally reviewed and recorded.

There is a significant change in the risk profile of water systems due to the low occupancy and the potential for continued low occupancy for an unspecified amount of time.

The objective of the risk assessment review is to establish whether it is still valid and effectively identify the risk posed by the water system. If it is deemed to be invalid, a new risk assessment should be procured as soon as practical; BS 8580-1:2019 offers guidance on how to undertake a risk assessment review.

## Flushing

If not already being undertaken, water system flushing should immediately be considered; enhanced flushing (more than once per week) should be discussed and implemented, as necessary.

For flushing to be effective, the individual outlets should be opened full bore (provided this doesn't represent a risk of flooding) and flushed until the temperature stabilises (this could be any length of time and should not be limited to two minutes).

It is good practice to schedule a significant system flush 24 hours after system disinfection to help with dislodging any accumulated biofilm.

It is vitally important when undertaking flushing of little-used outlets that the safety of the operatives completing the task is ensured. The potential to create aerosols should be reduced to as low a level as reasonably practicable for all types of outlets and this may require more than one method of control.

## Maintenance Prior to Reoccupation

Following any system disinfection, consideration should be given to the maintenance requirements for that system.

Disinfections can sometimes result in biofilm being dislodged and making its way to the point of use and being flushed out. Equally, if there is any type of obstruction or narrowing of the distribution pathway such as a TMV strainer, shower head, partially closed valve etc., the biofilm may simply become caught in it, resulting in potential issues.

Once a system has undergone disinfection, allowing for approx. 48-72 hours for completion of an acceptable amount of flushing, it would be beneficial to conduct a full service on showers, TMV's, thermostatic mixing taps (TMT's), in-line strainers and expansion vessels, among others.

In this way, you can maximise the efficacy of your recommissioning process and reduce ongoing issues.

The aim of the recommissioning process is to try as far as reasonably practicable to begin with a clean water system – disinfection alone will not do the trick and appropriate maintenance must accompany this process to be as successful as possible.



## Validation Sampling

This is a key stage in understanding if the system has been effectively disinfected and is deemed suitable for reoccupation.

Any validation sampling should be carried out at least 48 hours after the disinfection to ensure that the samples are representative of the system under normal conditions.

For the purpose of recommissioning, sample locations should be considered and planned in. Consideration should be given to the mains cold water service, cold water storage tanks, any calorifiers/buffer vessels (and any other potential seeding points) and sentinel outlets, as a minimum, to provide a representative profile of site; further representative sample locations may be required based on system design and risk profile.

There are a few types of samples that should be considered:

- Total viable count samples (TVC's)
- E-coli and coliform samples
- Legionella samples

TVC's are an indicator of the general efficacy of the disinfection as they will show the total number of all aerobic bacteria in the water system, presented as colony forming units (cfu). This test, however, will not show specific bacteria of a pathogenic nature (specifically Legionella in this case); it can, however, highlight areas of concern in the system that may offer an environment for bacteria to proliferate and give an understanding of the 'wholesomeness' of drinking water.

For water intended for human consumption, TVC's will provide an indication of how wholesome the water is in terms of its bacterial content. There is no regulatory limit on how high bacteria levels can be once they enter a building water system. Tetra Consulting has devised a set of guidelines for TVC levels in drinking water and can advise on request.

For identifying the presence of legionella, TVC's cannot be relied upon and specific Legionella samples must be taken.

Rapid microbiology sample kits are available for sampling for Legionella, but caution should be taken when considering these as they do not always offer the same scope as lab culture samples; the benefits and shortfalls should be weighed up to decide on the appropriate method. Expert advice on the pros and cons of rapid microbiology testing can be obtained from Tetra.

E-coli and coliform samples should not need to be taken unless there is a known risk. Issues such as pigeons and other vermin gaining access to cold water storage tanks would constitute such a risk and any number of E-coli or coliforms detected require immediate action.

HSG 274 indicates that Legionella positive counts under 100 cfu/l do not require action to be taken; however, it is good practice to investigate and/or act on all Legionella positives.

## What to do if it's still not acceptable

If, following the disinfection process and validation sampling, the system is shown to have issues, further action will be necessary. This should be proportionate to the issue, for example, undertaking another costly disinfection and sweep of samples would be excessive if only one or two low counts were presented.

Understanding the scope of the problem should inform further action.

Consider the following:

- What type of problem is it, Legionella, TVC or E-coli?
- Is it local to a couple of outlets or is it systemic?
- Is there a pattern or trend to a certain part of the building or a specific system?
- Are the outlets high risk such as showers?
- Do you have high risk occupants?
- Was the disinfection undertaken in line with the correct standards?
- Look at the detail of the issue – what types of fittings are installed, have you previously had problems in similar locations?

# Ongoing Management Considerations

The recommissioning process is one that requires planning and strategy but, so too, does the ongoing management of the water system under new circumstances.

## Water Usage and Little-Used Outlets

The overall water usage in the building(s) will need to be considered; low use is well known to adversely affect water quality. Consider the new usage patterns, how many new 'little-used outlets' you have, and the quantity of flushing that will be required to stave off stagnation issues – will once per week be enough? Ensure that records are held for all flushing programmes; these will be a key assurance for facilities managers in the coming months.

## Cold Water Storage Capacity

Consideration should be given to the reduction of storage capacity in cold water storage tanks to increase the turnover of water through the tank and reduce stagnation to a minimum.

A common technique is to drain and isolate one side of a set of tanks, thus reducing your storage by 50%; this technique, however, can cause further issues in the creation of dead legs and the need for disinfection upon reinstatement. It is far better, where practical, to reduce the nominal level of water in all connected tanks using the inlet valves and keeping the tanks balanced. In this way, you will not create any dead legs or incur further cost for disinfection works upon reinstatement of the tank.

## Surveillance Sampling

Surveillance sampling is the process of undertaking routine samples for water quality purposes to build trends and proactively manage water system issues as they occur.

HSG 274 suggests that routine sampling is not required under normal circumstances if your system is under control. Currently, however, a lot of systems will be experiencing much less usage and, therefore, validating that your new control scheme is working is worth considering.

Frequency of this sampling should be proportionate to the risk and the sampling method, for example, taking lab culture samples more frequently than monthly can leave little time for corrective action before new samples are taken.

Consider reducing the frequency back to original levels following satisfactory results over a defined period of time to show validation of your scheme of control.

# Evaporative Cooling Systems

During the lockdown period, these systems will have been at increased risk and should have been either effectively decommissioned or continually maintained to ensure the reduction of risk to as low a level as reasonably practicable.



# Recommissioning and Validation

## Start Up and Shut Down Plans

The management of evaporative cooling equipment is well established in HSG 274 part 1. Start up and shut down plans are a key element to managing the risk of bacterial proliferation in these systems.

Firstly, take stock of the situation: was your equipment decommissioned effectively following an established plan, or was it continually maintained throughout the lockdown period?

If neither of these are true, you may have increased risk and risk minimisation action should be considered immediately.

If your system was effectively decommissioned, consideration should now be given to the start up plan. Initially, it will be good practice to review it and ensure it is still fit for purpose before putting it into action. If you do not have one, creating one in collaboration with a Competent Person should be given top priority to ensure that the risks are managed.

If your system was continually maintained by competent persons throughout the lockdown period, then consideration should be given to the risk assessment and ongoing management.

## Risk Assessment

As with the 'hot and cold water system', the risk assessment will require a formal, recorded review.

Consider the impact that the lockdown has had on your system, and the impact that reduced occupancy may have.

Does the risk assessment still appropriately represent the risk of your system? Is it still valid?

If not, consider procuring a new risk assessment to highlight the risks as they currently stand and inform any new control scheme requirements.

# Ongoing Management Considerations

## Usage

Usage, in respect of evaporative cooling systems, is more to do with the overall occupancy of the areas requiring cooling. In an office block that now has 30% of the previous occupancy levels, the evaporative cooling demand will be drastically reduced, meaning there will be less evaporation happening and, therefore, less water turnover throughout the system.

Lower occupancy results in lower demand and lower water turnover in the cooling towers and makeup tanks. Stagnation can become an issue, resulting in elevated temperatures in the water supply to the cooling towers and growth of bacteria. The water treatment programme may require adjustment to account for lower water evaporation and turnover, for example, lowering the set point on the bleed to exchange the water.

The reduction of tank levels to increase water turnover should be considered, if necessary, as well as the effective decommissioning of equipment that is not required using an appropriate shut down plan, if need be.

## Sampling

Routine sampling for TVC (often using dip slides) and Legionella is suggested by HSG 274 part 1. The frequency of Legionella sampling may require reconsideration if:

- Heightened risk is determined due to the effects of lockdown or continued low occupancy, or;
- Dip slides show an increased bacterial load in the system and a trend is beginning to show.

# What Can Tetra Do To Help?

Tetra Consulting can offer the following services delivered by experienced, independent water safety professionals and Authorising Engineers:

- Independent specialist advice
- In-depth technical audit
- Policy / procedure / written scheme development
- Risk assessment review
- Assistance with Contractor management

Separate to the independent services, Tetra can also offer:

- Legionella Risk Assessments of domestic water systems, cooling systems and towers
- Outbreak investigations
- Asset capture and schematic drawings
- Strategic corporate compliance status audits
- Sampling and independent UKAS-accredited analysis for Legionella bacteria and other microbiological and chemical properties
- Legionella control logbooks
- City & Guilds water hygiene training programmes

# You're in safe hands

Tetra Consulting provides independent safety risk consultancy and smart solutions to help you protect your most important assets: people, property and brand. Our mission is to support and educate you and your company in safety risk management and compliance by providing solutions informed by our knowledge and client insights.

If you want to learn more about anything in this document, please drop us a quick email at [info@tetraconsulting.co.uk](mailto:info@tetraconsulting.co.uk)







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